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Broadband Technology - How Does xDSL Work? [page 2]

K
E   **CABLE xDSL SAT**
Y   **Technical Level: High**

TalkBroadband - How Does xDSL Work?

The technology unraveled!

As we now know xDSL works by taking full advantage of the copper telephone wires we currently have installed by allowing a greater use of the bandwidth (or range of signals on the wires). The bandwidth that is available is many times greater than that used for our calls however it requires a particular method of signalling to safely utilise it. Currently there are two main types of technology that are competing for the xDSL standard, these are the discrete multitone (or DMT system) which is the most widely used technology and also the carrierless amplitude/phase (CAP) system, which was adopted on many original installations.

The CAP method works by taking the entire bandwidth of the copper wires and simply splitting them up into 3 distinct sections or bands seperated to alleviate interference. Each signal band is then allocated a particular task. The first band is in the signal range of 0 to 4 khz and is used for telephone conversations. The second band occupies the range of 25 to 160 khz which is used as an upstream channel, whilst the third band covers from 240 khz up to a maximum (depending on conditions) of 1.5 mhz and is used as a downstream channel. This method was simple and effective as poor quality wires or large amounts of interference wouldn't affect the xDSL from working, instead it would just limit the range of the third band and result in slightly reduced speeds.

Voice   Upstream   Downstream
0-4khz   25-160khz   240hkz - 1.5Mhz
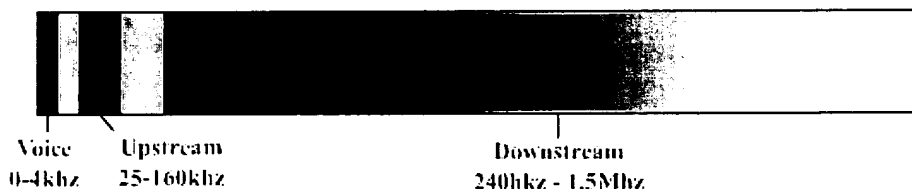
xDSL CAP System
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The DMT is system is much more complex. It works by splitting the entire frequency range (bandwidth) into 247 channels of 4 khz each and allocating a range of the lower channels, staring at around 8 khz, as bidirecitonal to provide upstream and downstream channels. By splitting the bandwidth up in this way it effectively allows one connection to operate as if there were 247 modems connected to it, each of which operating at 4 khz. The technology used in the DMT system is vasltly more complex than that required for the CAP method as each of the 247 channels requires constant monitoring and assessment. If the system

detects that a specific channel or range of channels are suffering from interference or a degredation in quality then the data stream must be automatically transferred to different channels. Finally, it is most likely that if you have the DMT system installed then you will need to place low pass filters into any telephone socket that you wish to make voice calls from. This is because voice calls take place below the 4 khz frequency and the filters simply block anything above this to prevent data signals interfering withe ur telephone call.

247 Unique Channels
4khz Each

xDSL DMT System
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